The Monthly Online Newspaper for the ARPANET Online Community

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ARPANET News

December 1973

Issue 10

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intersite communication and interaction
in the ARPA Computer Network

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Online Viewing Instructions ----------

To see any item, type: s/how/ multics : (for example)
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Printing time, TI Silent 700 using ODT, as above, 00:52:07
To return to Contents, type: s/how/ contents <CR>
To stop printing at any point, type: ↑O, Control O.

******** GREETINGS ********

From the Staff of the ARPANET News, we extend our very best wisnes for a MERRY CHRISTMAS and prosperous NEW YEAR and good health.

.....The Staff 1

(memo) To ARPANET News Readership

2

As a step towards improving the ARPANET News and ensuring its on-going viability and ability to better serve the community, this issue starts a new format and was developed with new procedures to minimize unnecessary effort in providing it to you in a timely fashion.

2a

Changes you will notice include:

(1) A contents section itemizing all included articles *(to allow you to "get the news" online with less effort.)*

(2) A change in the hard-copy issue as well as the on-line issue. We have reformatted to allow one file to answer the needs of all distribution requirements as a step towards reducing unnecessary expenses while ensuring earlier availability to you the readership.

(3) Deletion, within any issue, of mention to "Columns" if there is no news within the column. This does not mean a discontinuance of columns, just a desire to optimize the format for each issue and eliminate frustration in accessing on-line, a column that is vacuous.

2b

If any of these changes inconveniences your access to the news, please send comments to ISELI@ISI or JI through the NIC Journal. Any further suggestions on how to improve the quality and utility of YOUR Newsletter would be appreciated and will receive consideration.

.....The Editor

2c

(information) Information About the Publication

3

Hardcopy issue published monthly
Online updates available weekly
Sponsored by: ARPA/IPT
Distributed by: ARPA Network Information Center
Stanford Research Institute
Menlo Park, California 94025

3a

Editorial Staff:
Headed by Jean Iseli (MITRE) with volunteers who lend their welcome and appreciated assistance, as occasion arises:
Jeanne B. North (NIC
David H. Crocker (UCLA)
Mil Jernigan (NIC)
Mike A. Padlipsky (MIT-MULTICS)
Susan Poh (MITRE)
The young ladies in the NIC Office
Marcia Keeney
Judy Cooke
Carole Guilbault

3b

The online version is available to all Network members who receive online delivery from NIC. It can also be accessed by anyone who logs into SRI-ARC and uses the query language named nic.

3c

The online version contains the month's basic issue. Each week a branch is added, containing items received during the week. This update material is added to the new feature articles to produce the next month's issue.

3d

One hardcopy of the monthly issue will be sent to each Liaison, Principal Investigator, and Station Agent at Network Sites, and to Network Associates. Local reproduction of multiple copies is encouraged.

3e

Contributions to the NEWS may be forwarded to JI at NIC through the Journal, to ISELI@USC-ISI, or to Jean Iseli, The MITRE Corporation, National Systems Design Dept., Westgate Research Park, McLean, Va. 22101. News may also be forwarded to JBN through the NIC Journal, or mailed to Jeanne North at SRI.

3f

(calendar)	Events of Network Interest
1/3-4 74	* (using) USING Group Meeting at NIC
1/8-10 74	HAWAII-CON
1/10 74	* ARPANET INWG Mtg. after Hawaii Conf.
2/12-14 74	2nd Ann Computer Science Conference
4/22-23 74	Workshop on Machine-Independent Graphics
5/6-10 74	NCC 1974 National Computer Conference
5/23 74	(trends) IEEE Comp. Soc. Trends and Applications
6/17-19 74	IEEE Intl Conf on Communications ICC74
7/15-17 74	(graph) Conf on Comp Graphics
8/5-10 74	(ifip) IFIP Congress '74, Stockholm

A meeting listed here is sponsored by the Group named. Many meetings are open to other interested people. NIC document references are given where available.

Meetings sponsored by Groups in the Network are indicated by *.

4

(using) USING Group, ARPANET, meeting, 3-4 January 1974 at NIC, Menlo Park, California.

4a

Please contact Dave Crocker@UCLA or Nancy Neigus@BBN regarding any questions concerning the meeting. Mil Jernigan@NIC (phone (415)326-6200. ext. 4775) will be happy to make local hotel/motel reservations for you. All USING members please try to attend.

4a1

(trends) IEEE Computer Society, Trends and Applications Symposium, Gaithersburg, Md., 23 May 1974.

4b

A symposium in Trends and Applications in Computer Networks, sponsored by IEEE Computer Society Eastern Area Committee and the Washington, D.C. Chapter. Papers invited describing trends in computer network design and economics, tradeoffs in network design and applications of existing and proposed networks. Abstracts of approximately 1000 words due by 15 December 1973 to Kevin Casey, Catholic University, Computer Center, Washington, D.C. 20017.

4b1

(graph) Conference on Computer Graphics and Interactive Techniques, July 15-17, 1974, University of Colorado.

4c

This will be a formal conference with papers later published in the Journal of Computers and Graphics or in the proceedings. Ira Cotton will chair a session on Graphics and Networks, Jim George of Colorado State University will chair a session on Standards, and Andy van Dam of Brown University is planning one on Division of Labor between Central and Satellite Computers. Robert Schiffman of the University of Colorado, Boulder, Colorado 80302, is the Conference General Chairman, and Jon Meads of Tektronix, Delivery Station 81-872, Box 500, Beaverton, Oregon 97005, is the Program Chairman. Contact any of these if you have suggestions or wish to submit a paper.

4c1

(ifip) IFIP Congress '74, Stockholm, Sweden, 5-10 August 1974.

4d

To cover the whole range of information processing, including computer hardware and architecture, software, mathematical aspects of information processing, technological and scientific applications, applications in the social sciences and the humanities, systems for management and administration and social implications of computers. Dr. Herbert Freeman, Chairman, Programme Committee IFIP Congress '74, c/o AFIPS, 210 Summit Ave., Montvale, N.J. 07645.

4d1

(ucla-ph) Interview with Dr. Bob Hetherington UCLA School of Public Health

5

The purpose of this interview with Dr. Bob Hetherington, School of Public Health, UCLA, is to provide community awareness of a network resident data base and access mechanism in the area of mental health. The interview was conducted by Jean Iseli on 21 November 1973. Persons desiring more detailed information are invited to contact Dr. Bob Hetherington, UCLA; (213) 825-5379.

5a

[JI] : Dr. Hetherington, maybe we could start by your telling the readership of the plans, progress, and expectations of your effort in the area of mental health.

5b

[RWH] : Our research group at UCLA has received a 4-year grant from NIMH to survey the field of mental health evaluations. We are primarily interested in programs designed by professionals in the mental health field to meet problems in 18 areas of mental health. Some of these areas are: alcoholism, drug abuse, suicide, schizophrenia, autism, and divorce.

5c

However, our interest is not limited to the strictly psychiatric areas, since we also include programs designed to meet social problems. The idea occurred to us during the first year of operation that it might be a very exciting communications tactic to employ the ARPANET in the dissemination of our findings. As we visualize the method, we would establish our databank of program evaluations in mental and social health here at UCLA and open it to use by government officials, elected representatives, practitioners, administrators, professors and researchers (and students) via the ARPANET.

5d

In this way, both published and unpublished research findings in the area of our concern would be accessible to interested parties according to their own needs since the user would be able to sort and list any aspect of the databank he wished. With the great delays presently encountered with publishing materials, it is frequently the case that timely research findings do not reach key people until the occasion for their use has long passed. We also would be greatly interested in enhancing a 2-way flow of communication between users and the databank via the network in order that we can be as user oriented as possible.

5e

To summarize, we are surveying program evaluations in the broad area of mental and social health (presently from 1969 onward) in order to provide a computer-based databank of these evaluations coded on relevant aspects of study design, measurement techniques employed and outcome.

5f

In addition to the coded information for each evaluation, we will provide a formatted abstract of the evaluation. The user will be able to search the databank on the coded items (10), either separately or in combination. He will receive, as a result of his search, all evaluations in the databank which fit the codes he has specified. Each citation produced will contain authors, title, source and the formatted abstract (although the user may choose to have the abstract omitted if he wishes.

5g

(JI) : That is indeed a forward looking and fine use of the ARPANET to benefit this research community. are the access mechanisms you envision to be employed by users to be interactive or will the user specify his search criteria and in turn have that submitted for batch execution?

5h

(RWH) : Let me describe the procedure from the layman's perspective. The program being developed here at CCN by Donald M. Long which we demonstrated last week for a site committee from NIH was fully interactive. In other words, the user merely responded to a series of questions built into the program until all specifications for the search were defined, and then the search was conducted immediately and the results printed out on our CRT console. It is our hope that this type of service can be arranged for all users of the databank, and therefore we plan to keep the databank on-line here at all times. Initial use of the databank should be about February or March of 1974.

5i

(JI) : Bob, could you discuss the various aspects of user feedback you envision to ensure a real user orientation for the capability. For example, will users be able to augment your basic databank with comments relative to their found utility for assorted citations?

5j

(RHW) The major difficulty I perceive with current databanks such as MEDLARS is that the user is unable to define for himself the specifications of the search. I would hope that reactions from users would keep us informed of the flexibility and utility of the setup, and suggest ways in which it might be improved. Additionally I would hope users would help keep us updated as new programs are enlarged and designed so that they may be entered into the databank immediately.

5k

[ji] : Will Donald's program provide a means for users to provide feedback on-line while they are interacting with it, or do you envision a separate mechanism for that?

5l

[RWH] : Don Long is here so I'll ask him. He says, "I think we would want a separate program for updating primarily so we can edit what we get before it goes into the databank."

5m

[ji] : Yes, I can well understand the desirability of editing user input to your databank - what I was wondering was, is there going to be a mechanism provided for users to comment to you on assorted reactions to the service you are providing or comment on the appropriateness of the information they derive?

5n

[RWH] : Yes. That seems an essential part of our cconcept. But in addition to users making comments about their use of the databank, we will also want to provide them with information about our procedures (planned and accomplished) hopefully through the implementation of an on-line newsletter to be distributed over the ARPANET.

5o

[ji] : Do you envision, in time, an interface between your databank and its access mechanism and other data banks in allied fields?

5p

[RWH] : From a programmer's perspective, such an interface is quite feasible. However, from a substantive perspective the problem is that other databanks do not contain the type of evaluative information which we require in our databank. Hence, practically such an interface will be provided through our searching of all other relevant databanks for a range of appropriate publications, and then coding them to our specifications. This has been a part of our methodology from the start in order to cover the 18 fields as thoroughly as possible.

5q

[ji] : Bob, is it possible at this time to give an indication of the size of the databank as it will be in January-February and maybe indicate how rapidly you envision its growth?

5r

[RWH] : When the databank is first opened for limited use, we think about 60 relevant journals. A citation at the moment runs about 2000 bytes. Variable length depends on the length of the formatted abstract. Don tells me that the practical upper limit for an on-line databank is about 6000 citations. Regarding rate of growth of the databank, I can only tell you that our project is funded currently for 4 years, and we are at the end of the first year now.

5s

[JI] : If I were a researcher in your area, and performed a search to find a list of relevant citations, would I be able to get additional help in obtaining the program evaluations themselves?

5t

[RWH] : We will keep a copy of all program evaluations in the databank in our project files. I don't anticipate we will have the funds and staff required to meet the need for copies to all users. However, the databank will provide complete bibliographic information and will also provide name and address of the source.

5u

[JI] : Bob, maybe you could say a few words about how you envision your user community and perhaps even the ARPANET community interacting with your databank. What would you like to see happen?

5v

[RWH] : We are mainly interested in users who have something to do with the provision of mental health services or their evaluation. We see the users acting independently with reference to the databank. That means they would do their own searches, rather than asking us to do the searches for them. The larger ARPA community may be interested in the information retrieval aspects of our use of ARPANET and perhaps can suggest ways in which it can be improved.

5w

[JI] : Are there any particular areas where the Network could better assist you in the evolution of your databank and its access mechanism?

5x

[RWH] : We are starting to receive inquiries from potential users regarding how they become ARPANET users. We need to develop a response to these queries, and in some cases this will involve a fair amount of user education for those who are not acquainted with the system. Will there be any problem for users who wish to gain access to the ARPANET?

5y

[JI] : The most accurate response I can give to that is to point to the example of NLM's MEDLINE service. Persons who are interested in access to MEDLINE through ARPANET generally contact the nearest TIP and attempt to negotiate access to the Net through them. In general, if they are non-commercial organizations, they evidence little trouble. With commercial organizations, there is not a simple answer that I am aware of at this time. Those commercial organizations that have Government contract sponsorship may obtain entry through that sponsorship, those that do not, unfortunately, there is no easy answer there.

5z

[RWH] : The major portion of our users will be in the non-commercial category, so it sounds like little problem. Would private practitioners (psychiatrists, psychologists) be regarded as commercial users?

5aa

[ji] : Bob, I am afraid there is no good model for that. The best approach may be to inquire formally of ARPA relative to a policy in that area. To the best of my knowledge, this has not come up yet. If you like, I would be happy to investigate that on your behalf.

5aa

[RWH] : Thank you. I would appreciate it. I don't think I have further questions at this time. When we are ready to activate the databank next year, I will be in touch.

5ab

[ji] : Fine. I would very much invite you to give the ARPANET News an article at such a time as you are ready to accommodate users.

5ac

(symposium) Third Data Communications Symposium
A Report by Dr. David Wood (MITRE)

6

"Data Networks: Analysis and Design," was the theme of the Third Data Communications Symposium sponsored by the IEEE Computer Society and ACM, held 13-15 November 1973 in St. Petersburg, Florida. The previous meetings, in 1969 and 1971, were known as "Symposiums on Problems in the Optimization of Data Communications Systems," so some progress in optimization has been made since then.

6a

The beach resort location drew a capacity attendance in excess of 250. Testimony to the quality of the papers was shown by the steady attendance throughout the meeting, despite the temptations of sun and Gulf beaches.

6b

Summaries of some of the papers follow. The Proceedings are available from the IEEE Computer Society, ACM and IEEE.

6c

(arpa) Review of papers on ARPANET

6d

Two papers dealt directly with ARPANET: one from the University of Illinois and the other from Bolt, Beranek and Newman. The subject of the Illinois paper, by W. Bouknight et al, is the ARPA Network Terminal System (ANTS). ANTS, which is built around a PDP-11, supports a wide range of terminals and peripheral hardware, and provides users with access to the various host computers on ARPANET. The hardware organization and software organization are described in the paper, together with the capabilities of the command language as seen by the user. Finally, plans for future development of ANTS are discussed. ARPANET sites currently or shortly employing ANTS systems are, Belvoir, BRL, and Livermore, in addition to Illinois. See the September 1973 issue of ARPANET News for an interview on the subject of ANTS.

6d1

The BBN paper, by W. Crowther et al, entitled, "Reliability Issues in the ARPA Network," recounts the various types of reliability problems experienced since inception of the network and approaches used to overcome them. Changes made to the IMP communications subnet over the years in order to improve reliability are summarized, and the current impact of failures in the various components of the network are addressed. Finally, the paper describes the reliability considerations in the design of the new high-speed IMP.

6d2

(other) Other selected Papers

6e

Papers were presented on a variety of aspects of networking, including packet switching, circuit switching, loop networks, data communications systems, teleprocessing systems, interfaces and simulation.

6e1

Two networks previously rarely described in the literature were discussed: a packet-switching network in France known as Cyclades; and a loop network at the National Security Agency.

6e2

Much interest was shown in a data communications system known as Data Route being offered by Bell Canada which essentially multiplexes users data traffic, with notable savings to users with low data rates, such as 110 and 300 baud. (not in proceedings). One of the several papers from Japan presents a good analysis of the trade-offs between CIRCUIT AND PACKET SWITCHING NETWORKS.

6e3

A paper by A.G. Fraser at Bell Laboratories continues the theme of his July 1972 Communications of the ACM article, discussing the need for a new communications interface between computers and data communications systems. A particular interface which meets the objectives of such a new interface is described. The paper may prove to be one of the most significant at the symposium if measured by the frequency of reference in the future.

6e4

(extra) ARPANET News Supplement (New Feature)

7

To serve the purpose of providing a forum for articles which may be inappropriate for the ARPANET News either because of length or because they are directed at a subset of the readership, a new feature is being added with this issue. The feature is a supplement to the News which will not be distributed to the hardcopy mailing but, which will be available for viewing online or for printing online. To view the supplement online, type when in NIC Query: b(ring)<help>extra<CR>, or for viewing and/or printing in NLS, L(oad) F(ile) <help>extra CA.

Additionally, the supplement will serve the purpose of being an online repository of past ARPANET News articles of longer term informational value. These articles will be contained in a separate section.

The current contents of the supplement are given in the following two contents listings:

7a

(supplement) Supplementary Articles

(humanities) Article devoted to Human-Computer Interaction

7b

(cumulative) Historical Past News Articles

(illinois)	Description of University of Illinois Work
(uk-ics)	The University College, London
(usc-isi)	USC Information Sciences Institute
(bbn-net)	Status Report on the TERMINAL IMP
(using)	ARPANET USERS Interest Group Charter
(kuo)	An Online Interview with Dr. Frank KUO (see alona)
(cmu)	Carnegie-Mellon Computer Science Department
(aloha)	The ALOHA System
(nbs)	Online Interview with IRA Cotton of NBS
(netjour)	Network Journal Submission and Delivery

7c

(bbn) Featured Site: BBN-TENEX
.....by Jerry Burchfiel (BBN)

6

The BBN-TENEX site is operated by Bolt, Beranek and Newman's Computer Science Division. The facilities and staff are separate from those of BBN-NET, which is operated by the BBN Computer Systems Division, and which will be surveyed in a future article.

6a

Started in 1948 as a two-man partnership, BBN became a corporation in 1953 and a publicly held company in 1961; the company was listed on the American Stock Exchange in 1970. In the quarter of a century since BBN was founded, the Company has earned an excellent reputation for the high quality of its scientific and technical activities. The Company's original activity of consulting in architectural acoustics and noise control has flourished through the years and today the business includes a wide diversity of other activities encompassing services and special products related to acoustics and computer technology. BBN employs more than 550 persons in six U.S. cities. Each year the Company serves hundreds of clients, with results of BBN's efforts to be found in countries throughout the world, in space, and in the ocean.

6b

BBN's Computer Science Division has a staff of 50 full-time and 12 part-time employees. The bulk of the division's support comes from the Advanced Research Projects Agency of the Department of Defense, but a variety of research efforts are underway for other sponsors. These areas of effort include intelligent computer aided instruction, robot studies, transportation systems, programming languages, and semantic networks.

6c

Our ARPA research falls into four main categories: the TENEX Operating System, Distributed Computation, Speech Understanding, and Speech Compression.

6d

1. TENEX Operating System

6e

The TENEX system was developed in 1969 to serve as an inexpensive research facility which is both powerful and flexible. TENEX provides virtual memory, a hierarchy of processes for each job, a pseudointerrupt system for interprocess communication, and a highly human-engineered command language. This system has proved to be such a popular research tool that there are (as of November 1973) twelve TENEX systems in operation, ten of which are currently hosts on the ARPANET. The system is described in more detail in [1], [2].

6f

We are currently engaged in an exploration of the impact of the ARPANET on integrated multi-computer operations with respect to the TENEX operating system. Two complementary areas of our investigation are:

How can TENEX systems be coupled across the ARPANET to provide a more powerful and reliable distributed computing environment?

How should the hardware and software modules of TENEX be mapped onto a network environment to provide the most flexible and cost-effective distributed computing service?

Investigations in the second area are concerned with augmenting the basic architecture of a TENEX system to make best use of a network environment. This involves the modularization of the system into stand-alone functional components which execute on separate pieces of hardware, and which are connected only by communications protocols across the ARPANET.

The first such factorization is the separation of peripherals and the device processes which control them from the facility which provides user computation service. With this architecture, a user's peripherals and the tightly coupled processes which control them are local to him, while his user process can be executing at any remote TENEX service site. If he happens to be local to some service site, his device processes can execute there while his user computation proceeds elsewhere.

However, for reasons of economy of hardware and operation, these device processes are better executed on a network mini-host rather than a major TENEX service center.

This approach also promises more reliable TENEX service through flexibility: if a service site goes out of operation, the mini-host can obtain the same computation service from any other TENEX service site on the network. Conversely, since each service site can provide computation service to many such mini-hosts on the network, the loss of one such mini-host only means that a small fraction of the users are isolated.

The major research required in this area is the development of protocols which are sufficiently powerful, efficient, extensible and robust to couple the user processes and the device processes.

2. Distributed Computation

Distributed computing is a kind of computing in which two or more separate (and possibly geographically remote) parts work cooperatively to perform a particular computational function.

8p

In the area of distributed computation we are investigating issues such as: what new requirements does the network environment place on operating systems; what sort of functions are best implemented in a distributed way; how can such functions best be partitioned into parts; what sorts of interactions should occur between the parts (protocol design, interprocess communication); how can the collection of parts be controlled (i.e., started, stopped, debugged); how should data bases be organized in a distributed environment; what should the user interface to a distributed system be? Our approach is to study these issues in a practical context by constructing and experimenting with distributed systems for the ARPANET. McROSS, a distributed system for air traffic simulation studies *[3]* is one such system.

8q

We are developing the RSEXEC (Resource Sharing Executive) system which acts to couple the individual TENEX hosts so that they operate like a single multi-host TENEX system and, in addition, serves as a sophisticated network command language interpreter for TIP users *[4,5,6]*.

8r

Our long term goal is to acquire an understanding of the issues noted above so that we can develop techniques which will make it a routine matter to program, debug and maintain distributed systems.

8s

3. Speech Understanding

8t

The speech understanding project at BBN is part of a five year ARPA effort which is being coordinated among several ARPA sites by the Speech Understanding Research (SUR) Steering Committee. Our research involves integrating capabilities in signal processing, phonology, syntax, and semantics into a prototype system to understand continuous spoken utterances in limited semantic domains. We have developed a good feeling for the scope of the problems through an approach of "incremental" simulation, and have developed a design which we think will be effective. We are in the process of implementing and evolving this design.

8u

Under the area of English Language Processing, we are continuing research on understanding of natural language, including the investigation of the properties of the transition network grammar model, the continued development of a grammar of English within the transition network formalism, the investigation of the semantics of natural English, and the acoustical and phonological analysis of continuous speech.

Although each of these areas is an ongoing research area in its own right, we will for the next few years be directing our studies in such a way as to support the development of a prototype computer system for answering spoken English questions and responding correctly to spoken English instructions. We are continuing developing this system and to perform experiments to determine performance tradeoffs for different strategies and different types of applications. In the past year we have made considerable progress in designing and implementing our first cut system, and have an operating prototype system. There still remains considerable additional research, refinement and improvement of programs, and incorporation of results of prosodic and phonological research required in order to produce the viable speech understanding prototype which is the target of the ARPA five year development effort.

4. Speech Compression

In the speech compression project we have as our goal the design of a time-asynchronous (i.e. variable transmission rate) digital vocoder. The performance of the vocoder will be judged according to three factors:

The transmission bit rate.
The quality of the synthesized speech.
The cost of implementation in terms of computation load.

Although the last factor is of considerable importance for a hardware implementation, we have taken the attitude that hardware computation costs are rapidly decreasing and hence we have placed the cost of computation as the least crucial of the three factors above. This is reflected in the fact that all our computations are performed in floating point arithmetic on a 36-bit computer. Of course, the transmitted parameters are all quantized to reduce the transmission rate. Therefore, our main aim is to minimize the transmission bit rate while maintaining the good quality of the synthesized speech. We emphasize here that the transmission rate is expected to be variable depending on the properties of the changing speech signal. However, we expect the transmission rate to have a low average as well as a low upper bound.

8ab

We are looking into the interesting possibility of using vocoded speech as input to a speech understanding system. Much of the acoustic analysis that is currently being performed at BBN is the same for both the speech compression project and the speech understanding project. So, the future possibility of using the same analysis for both purposes is indeed a real one.

8ac

In addition to its research activities, the BBN Computer Science Division also operates the BBN-TENEX Service Facility. Service is provided to network users. Potential users should contact the operations manager (Steve Chipman) at BBN.

8ad

The primary computer at this site is a PDP-10 with a memory size of 192K 36-bit words. Also included is a hardware "pager" which allows user access to a virtual memory of 256K for each process.

8ae

Peripheral equipment includes:

Paging drum of 1.56 million words with an average access time of about 16.7 milliseconds
6 Calcomp 215 disk packs - 74 million words
A 64-line teletype scanner
Two magnetic tape drives (7-track tape, 200/556/800 bpi)
Two DEC tape drives
Paper tape reader and punch
Line printer (132 columns, 600 lines/minute)
Calcomp 695 11" Drum Plotter

8af

Network users and local users currently compete equally for use of the resources of the system. Usual peak local usage is centered around 1200 and 1800 EST or EDT on weekdays. BBN-TENEX is a seven day a week, 24 hours a day service with the exception of eight hours of hardware maintenance every Sunday night starting at 2300 EST.

8ag

Long-term online storage is available to network users on magnetic disc. (The disc storage is backed up by daily tape dumps, but offline magnetic tape storage is not currently available to users.) A total of about 5 million 36-bit words of storage will be available. Text is normally packed five 7-bit characters per storage word.

8an

The following is a list of available TENEX documentation. Purchase of this documentation can be made with a purchase order or check made out and sent to BBN.

8ai

The TENEX Users Guide (TUG) contains writeups on all subsystems written at BBN except BBN LISP. The TUG index also contains a list of subsystems not written by BBN with a reference to the manual that contains the appropriate information.

8aj

The TENEX JSYS Manual defines all of the monitor calls which exist in the TENEX system.

8ak

The TENEX Executive Manual contains all the EXEC commands that a user needs to communicate with TENEX.

8al

BBN LISP Manual contains extensive documentation on the LISP system.

8am

E&S Display Software Manual contains information on the Evans & Sutherland Display System.

8an

The TENEX Monitor Manual is a technical summary of the TENEX monitor.

8ao

Manuals are updated periodically and new versions are announced via memoranda which are sent to all users of the system.

8ap

Manuals of interest to the beginner are the EXEC Manual, TENEX Users Guide, and the DECsystem 10 Handbooks. The following handbooks are available directly from DEC:

8aq

User's Handbook
Mathematical Handbook
Assembly Language
Cobol Language

8ar

REFERENCES

8as

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8ay

(forum) Institute for the Future : Computer Conferencing

.....Jacques F. Vallee

9

The Institute for the Future, a small, nonprofit research organization based in Menlo Park, California, has developed a program for computer conferencing which is available on the ARPA network. The program is called FORUM and will be fully distributed in March 1974, but it can already be used in pre-release form on the USC-ISI and BBN sites of the network. Other PDP-10 sites interested in running FORUM under TENEX are invited to contact Dr. Jacques Vallee at (415) 854-6322 to make arrangements for transfer of the program.

9a

FORUM is a re-entrant, assembly language program that uses a fully-paged file system. It operates well interactively even during peak loads. The system enables geographically distributed users to interact on either a real-time or a delayed basis under a variety of conference formats ranging from free discussion to a full questionaire structure.

9b

The participant can gain a rapid view of all conferences open to him-- both those in which he is a registered member and those which are public. Within a given discussion, he can interact in real-time with all active participants in the group. He can submit anonymous entries, send private messages, and follow changes in paticipant status. The numbering of entries provides an easy reference to previous comments in the discussion.

9c

FORUM contains support software for a variety of CRT terminals. Automatic pagination, scrolling, and cursor control in line editing are among the support features.

9d

Program documentation is provided on-line by typing a question mark at any point. Users wishing to experiment with the pre-release version of FORUM are welcome to contact The Institute For the Future.

9e

(tenex) New Tenex Release

.....Extracted from <documentation>exec.blurb@case-10 and from a Message from Bill Plummer BBN.

10

The following represents recent changes made to the TENEX EXEC. The standard changes are indicated first, and followed by CASE-10 specific changes which may also be of interest to the general TENEX user community.

10a

The following include the BBN implemented changes in the new EXEC 1.51:

10b

A single ↑T does nothing but ding, 2 ↑T's within 15 seconds will request the old "verbose" typeout -- but this will be honored only if at least a minute has elapsed since the previous verbose typeout.

10c

TRMSTAT command has been added. This command prints all kinds of (interesting?) information about your teletype such as whether you have tabs, your control character sets, wake-up sets, etc, etc.

10d

LENGTH command allows you to specify the page length of your terminal.

10e

Several new terminal types are supported; type a "?" to the "TERMINAL" command in TENEX EXEC to see them.

10f

Ephemerons: A .SAV file can be declared ephemeral or not ephemeral by the commands:
@EPHEMERAL (file) <file-name> and
@NOT EPHEMERAL (file) <file-name>

10g

A file which is ephemeral shows on a directory listing with a ";e". An ephemeral file, when run by typing its name only to the EXEC's "@" is run in a separate fork instead of the regular user fork. This means that after such a program exits, the program you were running previously, is still there. The overall efect is to make a program look like an EXEC command. If you ↑C out of an ephemeral, you cannot continue it. (Just as you cannot continue a TYPE or DIRECTORY command.) You can however ↑C out of a regular program, run an ephemeral program, and then CONTINUE the original program.

10h

The AUTHOR subcommand has finally been added to the DIRECTORY command. This subcommand types the name of the last person who wrote into a file.

10i

The INTERROGATE command has been updated slightly - a little smarter, and prints more information.

10j

The changes made to EXEC 1.51 at CASE-10 in addition to the above, include:

10k

1) The SYSTAT command now prints the runtime, (in milliseconds) the connected directory (if different from logged in directory) and the foreign host for network users. Also, the detached jobs are listed last.

10l

2) A WHO command has been added for the sake of those poor people stuck on slow terminals who won't appreciate the longer typeouts of the SYSTAT command. This command lists job number, user name and teletype only.

10m

3) The ASSIGN command has been modified to search for an unassigned magtape or DECtape drive.

10n

@ASSIGN (device) MTA or DTA

will look for the first available device, then print

MTAn: assigned. or DTAn:

to indicate which unit it found. Note: On DECtapes, unit 0 is always skipped since monitor types like to keep the system tape mounted on DTA0. Any DECtape which is mounted is skipped even if not assigned since some people put up a tape and fail to assign it.

10o

4) Account number checking has finally been implemented by BBN, and we have changed over to their system to simplify EXEC maintenance. From a user's viewpoint, there should be no changes other than slower response.

10p

5) 10/50 compatible CCL commands have been added:

10q

@COMPILE <stuff>
@LOAD <stuff>
@XQT <stuff>

10r

where <stuff> is a list of file names and switches calls the CCL subsystem, and hands it "command <stuff>". CCL then generates the appropriate command files for MACRO, SAIL, LOADER, etc. and then calls whatever programs are needed. If any of these commands are typed with no argument, the last argument typed is used. If no argument has ever been used, EXEC will complain.

10s

NOTE: Since these commands all work through CCL, all 10/50 restrictions apply to the argument. That is, there is no recognition, files must be 6 character names and 3 character extensions, and other directories must be specified as /0,directory-number/ following the file name. These commands were not meant to be correctly implemented or lasting, but only a quick measure to bring TENEX at least up to the human engineering level of 10/50 in the program compiling/running area.

10t

For more information on the format of CCL commands, see the DECsystem-10 Users' Handbook.

10u

6) A DESCRIBE command has been added to provide descriptions of EXEC commands or other TENEX features. The format is

10v

@DESCRIBE <item>

Where <item> is the command or feature. ? may be typed to get a list of items. (Be prepared for a long list.) The items preceeded by a "-" are lists of items which fall into various categories. For example,

@DESCRIBE -ACCESS-COMMANDS
The access-commands are:
login, logout, change, detach, attach.

would indicate the access commands which can be described are LOGIN, LOGOUT, ...

10w

7) The autologout timing characteristics have been changed. If a job is not logged in, and types a "LINK" command, his autologout grace period is extended to 10 minutes. On a BREAK (links) command, his period is cut back to the usual shorter time.

10x

8) A new command, NUMBER has been added to provide the directory number given a directory name. This is useful for compatibility programs (or CCL) where you cannot use the usual <directory> construction. Format is:

10y

@NUMBER (for directory name) <directory>
directory number n.

10z

9) A new command NAME is the inverse of NUMBER. Given a directory number, it tells you the directory name.

10aa

@NAME (of user number) <number>
directory-name

10aa

10) Another new command, ERSTR gives you the error message for a given error number. (For programs which don't do the conversion themselves.)

10ab

@ERSTR (error number) 600123
OPENF: Write access not allowed

10ac

(sussex) London TIP Connection
Copy of Typescript (Also see RFC #588/NIC 20217)

11

The London TIP, SUSSEX, Host 42 decimal, or 52 octal, can now be reached by ARPANET users. See the following trial TENEX Telnet Typescript, showing entry to the PDP-9 front end to the Rutherford High Energy Laboratory IBM 360/195, and subsequent entry and logout to the IBM 360/195.

11a

```
TELNET typescript file started at TUE 20 NOV 73 0743:00

#connection.to 52 is complete.#
INDRA COMPUTING SERVICE - 15 45 GMT  ON 20 NOV 73
TYPE %H<CR> FOR HELP

%h
THE HOST AT ULICS IS A PDP-9 AS FRONT END TO AN IBM 360/195
COMMANDS TO THE PDP-9 ARE :
%HELP (%H)
%LOGIN ID=**,ACCT=**
%LOGOUT
%OPERATOR (%O)
%STATUS (%S)
ALL COMMANDS TERMINATE WITH CARRIAGE RETURN
WHEN NOT LOGGED IN TO 360 ALL LINES GO TO OPERATOR

WILL USA USERS PLEASE TYPE A COUPLE OF LINES SAYING WHO
 THEY ARE BEFORE THEY LOG IN TO THE 360
FOR FURTHER HELP LOGIN TO THE 360 WITH:
%LOGIN GUEST
AND IF SUCESSFUL TYPE:
TYPE JB=HELP

THE IBM 360/195 IS  UP

THE SYSTEM HAS NO PROMPT AND ONLY TWO CONTROL CHARS:
CTRL U  TO CANCEL A LINE
DELETE (177) TO DELETE A CHAR
%login guest
 USER 21 F7 BL=  140/  250 TL= 114 NL=  6 TG=   0 NG=  0 TJ=  0.45
NJ=  9
%logout
 OK      F7 BL=  140/  250 TL= 114 NL=  7 TG=   0 NG=  0 TJ=  0.45
NJ=  9
```

11b

(ants) Extracts from ANTS Users Group News for November

12

(steer) Formation of ARPA-IPT ANTS Development Steering Committee

12a

At the request of Steve Crocker of the ARPA-IPT office, a committee of potential and planned ANTS users has been formed to represent ARPA's interests. The committee will provide technical suggestions for the extension and improvement of ANTS' capabilities. Any ANTS user (current, planned, or possible) may direct suggestions or comments to DCROCKER@USC-ISI or DHC thru NIC Journal. Readers are invited to see Volume 1, Number 3, November 1973, issue of the ANTS Users Group News for a list of ANTS General Specifications developed by the committee.

12a1

(users) ANTS Users Group Meeting in March

12b

An ANTS Users Group Meeting will be held in late March. A date for a two-day session in Urbana will be announced in January. Anyone interested in ANTS design, development, acquisition, or support will be welcome. Inquiries should be directed to: Karl Kelley, NTS Project, Center for Advanced Computation, Advanced Computation Building, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

12b1

(status) ANTS II Development Status

12c

All level 0 and a few basic Level 2 functions have been checked out and appear operational. Completion of ANTS II.0 involves debugging of the terminal handler and the Level 1 functions which it exercises, which has begun; and transfer of TELNET and the NCP from ANTS I, which has yet to be done.

12c1

(staff) New NTS Project Staff

12d

On 1 November, Karl C. Kelley rejoined the staff of the Center's Network Terminal Systems Project. Karl was formerly Network Technical Liasion for the Center and will now be responsible for project activities concerned with user interface and, in particular, bringing much needed direction to the area of documentation and user education. Karl will assume editorship of the ANTS Users Group News with its next issue.

12d1

(multics) Multics Address Change [MAP]

13

From: Padlipsky.CompNet at MIT-Multics

13a

We will be changing the Network address of MIT-Multics from 6 to 44 (decimal) on Monday, December 17, 1973. Please make any necessary table and program changes then, and accept our apologies for the inconvenience.

13b

The change was necessitated by the facts that 1) there were some nine uses for the four ports on IMP 6, making a second MIT IMP desirable; 2) there were four very active Hosts on IMP 6, making the shift of at least one of them to the new, less busy IMP desirable; and 3) the new Multics machine is some 2000 feet from the old IMP, making it the logical candidate for the move.

13c

It is likely that we will have one or two additional test sessions on the new IMP prior to the changeover date. These will be announced in our "message of the day", and would only affect -- temporarily -- users who cannot employ numeric Host addresses directly.

13d

(neted) NETED Status Report /MAP/

14

Response to my RFC 569 proposing a simple, common context editor for ARPA Network Servers has been extremely good. As of this writing, there are four implementations of NETED reported as running and two more which I've been told are being worked on. Subject to possible glitch correction, available are:

14a

1) Multics version. This is the original of the proposal. Written in PL/I, the implementation is documented in Chapter 4 of Part I of the Multics Programmers' Manual. For further information, contact me.

14b

2) TENEX version. This was ready a day or two after the RFC was published, probably because its implementer is an active member of the Network User Interest Group who had seen the RFC in draft form. Written in SAIL, it offers "prompts", a "q" request for quitting out, and a "g" request for getting an old file, in addition to the basic package. For further information, contact Jim Calvin (Case-western Reserve).

14c

3) TSS version. This implementation has an instructive history: it is derived from the standard editor on the Ames 67, which derives from the CP/CMS editor, which in turn derives from the original CPSS editor, from which "eds" (NETED's original name on Multics) was derived. The morals would seem to be that it's not all that big a world, and that the Not Invented Here Syndrome is apparently curable. Written in "bare bones 360 Assembly Language". For further information, contact Wayne Hathaway (Ames-67).

14d

4) TSO version. I haven't checked this one out yet, but assume that if it had any bugs they will have been taken care of by the time you read this. Written in F level PL/I. For further information, contact Chris Thomas or Bob Braden (UCLA-CCN).

14e

Of course, all of us would be quite willing to share our implementations with other Servers. Presumably, the TENEX version will be picked up by other TENEX Hosts now that they know it's available -- and could be easily altered to suit 10/50 Hosts.

14f

The other two reported implementations are an NLS version (Dick Watson at the NIC), which will feature some sort of sensible way of establishing the end of an NLS "statement" (I've suggested either a line ending in a period or a question mark, or a line consisting of only a "%" as alternatives to treating newline as the end of statement indicator); and an ITS version (Mike Brescia at MIT-DMCG), which will bring the other three MIT Hosts into the fold.

14g

A small "users' manual" is currently in draft form in my home directory. I'll be submitting it to the NIC shortly for Resource Notebook distribution. (Contact me if you can't wait.)

14n

With any luck at all, there'll be more good NETED news in the next edition of the NEWS, but that's it for now.

Mike Padlipsky
MIT-Multics

141

Editor's note: Mike, You forgot Dave Grothe's UCSD NETED that is going to be CRASH Proof....See him at Illinois-ANTS. We understand that the program is almost finished, still a bit to do on the crash proofing. When the B6700 version comes up, there will be: (1) a help verb which essentially parrots the description portion of RFC 569, and (2) the help text will include a description of the crash proofing technique for the skeptical /as recounted by Dave./ 14J

(abstracts) Abstracts of Recent Documents of Interest

15

Mike Padlipsky (Massachusetts Institute of Technology, MIT-MULTICS). NETED: A Common Editor for the ARPA Network, NWG/RFC 559, USING Note 7. 7p. NIC 18972, 19932.

A proposal and spec for a simple-minded text editor that can be quickly and easily implemented on a network wide basis, designed for the naive user of line oriented systems. To the user NETED will appear the same regardless of which system is maintaining it. The draft of this document was published as USING Note 1, NIC 16890.

15a

Abhay Bhushan, Neal D. Ryan (Massachusetts Institute of Technology, MIT-DMS). Using MIT-MATHLAB MACSYMA From MIT-DMS MUDDLE - An Experiment in Automated Resource Sharing. NWG/RFC 576. 13p. 6 October 1973. NIC 19501.

A description of an experiment in non-trivial automated resource sharing between dissimilar systems. The goal was to interface the MUDDLE System at MIT-DMS to the MACSYMA System at MIT-MATHLAB, in such a manner that the MUDDLE-user is not required to know anything about the ARPANET, MATHLAB, or even MACSYMA. The program performs all the required tasks of connecting to MATHLAB, login, and using MACSYMA. The resource-sharing program (whose existence the user need not be aware of) does the translation from the MUDDLE "prefix" form to the MACSYMA "infix" form on I/O. This ability allows the MACSYMA resources to be completely integrated into MUDDLE to the extent that parts of the same computation can be performed by MACSYMA and other parts by MUDDLE.

15c

W. L. Price (National Physical Laboratory, Division of Computer Science, Teddington, Middlesex, England). Simulation of a Packet-Switched Data Network Operating Under Isarithmic Control With a Revised Link and Node Protocol. 28p. September 1973. NPL Report COM 71. NIC 18927.

No extracts from this report may be reproduced. Interested persons should contact the author.

15c

Lawrence G. Roberts (Advanced Research Projects Agency, Information Processing Techniques). Dynamic Allocation of Satellite Capacity Through Packet Reservation. In: Selected Papers: International Advanced Study Institute, Computer Communication Networks, edited by R. L. Grimsdale and Frank F. Kuo. University of Sussex, Brighton, England (publisher). 17p. September 1973. NIC 18920.

A packet reservation system which takes full advantage of the multiaccess broadcast properties of satellite systems is described and analytically compared to four other techniques: A fully connected channelized net; a store and forward star net; a Time Division Multi-Access (TDMA) technique; and the ALOHA random access packet broadcast technique. Under almost all traffic loads, the packet reservation technique is 3 to 500 times cheaper for the same performance than the other techniques (unless less than .55 second's delay is required, in which case the ALOHA technique is superior).

15d

Jacques Vallee, Robert Johansen, Hubert M. Lipinski, Richard H. Miller (The Institute For the Future, Menlo Park, California). ARPA Policy-Formulation Interrogation Network - Semiannual Technical Report, 15 September 1973. 38p. NIC 18879.

A review of practical experience in using the teleconferencing program FORUM, both at The Institute For the Future and within the ARPANET community. Three sections describe: (1) the current program status; (2) user experience to date; and (3) implementation plans beyond the present Release 4. An analysis of user reaction at USC-ISI is described and background data are given.

15e

Leonard Kleinrock (University of California at Los Angeles, Computer Science Department). Performance Models and Measurements of the ARPA Computer Network. In: Selected Papers: International Advanced Study Institute, Computer Communication Networks, edited by R. L. Grimsdale and Frank F. Kuo. University of Sussex, Brighton, England (publisher). 25p. September 1973. NIC 18922.

> Described are some of the analytical modeling procedures found useful in predicting the performance of the ARPANET; these predictions are then related to simulation and measurements results. Performance evaluation methods found useful are summarized. Techniques developed have allowed better evaluation of system performance. Some of the remaining problems are described.

15f

Frank E. Heart, S. M. Ornstein, W. R. Crowther, W. B. Barker (Bolt Beranek and Newman Inc.). A New Minicomputer/Multiprocessor for the ARPA Network. In: Selected Papers: International Advanced Study Institute, Computer Communication Networks, edited by R. L. Grimsdale and Frank F. Kuo. University of Sussex, Brighton, England (publisher). 46p. September 1973. NIC 18921.

> A new minicomputer/multiprocessor to serve as a switching node in the ARPANET involves 14 Lockheed SUE processors, interconnected with memory and I/O by "bus couplers" which serve as a distributed and expandable "switch". A novel control scheme permits complete elimination of processor specialization producing a highly modular system.

15g

Carnegie-Mellon University, Pittsburgh, Pennsylvania. Computer Science Research Review 1972-73, Annual Report. 64p. September 1973. NIC 19202.

> Contains 4 original short papers on design augmentation, scheduling of concurrent processes, analytical models in the study of computing systems, cognitive psychology as applied to memory and problem solving.

15h

Vint G. Cerf (Stanford University, Engineering Research Laboratory), D. D. Cowen, R. C. Mullin, and R. G. Stanton. Topological Design Considerations in Computer Communication Networks. In: Selected Papers: International Advanced Study Institute, Computer Communication Networks, edited by R. L. Grimsdale, Frank F. Kuo. University of Sussex, Brighton, England (publisher). 18p. September 1973. NIC 19723.

Describes use of a linear graph model to establish a lower bound on delay and vulnerability for computer communication networks. The lower bound on delay is characterized by measuring the average minimum path length in the regular-type graphs considered. Vulnerability of these networks is shown to be equal to the valence of one of the vertices for the trivalent graphs, and it is conjectured that this is true for higher valences. Designers may usefully measure this network against these so-called "ideal" networks.

151

John Barden (Case Western Reserve University, Cleveland, Ohio). The Computing and Information Sciences and Engineering, Status Report 1972-73. 55p. Summer 1973. NIC 19201.

Describes facilities and functions of the Department of Computing and Information Sciences. There are two major computing systems, a Univac 1108 and the DEC PDP-10 (TENEX), which supports the CASE-10 node of the ARPANET. Work is mentioned of two related organizations, a programming consultant firm, Consultants in Computer Technology, Inc., operated by experienced undergraduates, and Chi Corporation, a wholly owned subsidiary of the University, which serves the larger community through wholesaling computer services. Contains a list of titles of 19 master's theses issued in 1972-73.

153

Susan Poh (MITRE Corporation, Westgate Research Park, McLean, Virginia). Teaching and Learning Chinese in a Computer Environment. 28p. October 1973. M73-207. NIC 19204.

An experimental system establishes a set of instructional tools, designed to enable the teaching and learning of Chinese in a systematic, simple, and effective way. Computer graphics display is used to present the basic strokes to the student and shows how the strokes are systematically combined to form Chinese ideograms. The system consists of special purpose software, LOGO, on a PDP-10, a TTY-like terminal for alphanumeric input, and an IMLAC mini-computer as a graphic display terminal.

15K

(packet) PCI Receives FCC License

16

Packet Communications Inc. (PACKET) was authorized on November 14, 1973, by the Federal Communications Commission to institute and operate a packet-switched communications network service in the contiguous United States by leasing lines from established communications common carriers.

16a

In a separate but related action, AT&T was granted a waiver of the Rules to permit it to modify its private line tariff to allow composite data service vendors such as PACKET to lease lines from AT&T without resale and third party use restrictions.

16b

PACKET's customers will be able to connect their computers to the PACKET network through a Packet Switching Processor (PSP). Access from terminals will be provided through Terminal Access Processors (TAPs). The entire network will be supervised and monitored by two network operations centers (NOCs), one in the Boston area and the other in the western United States. Channels leased from AT&T and other carriers will be used to link the customer computers and terminals to the PSPs and TAPs as well as to interconnect the PSPs. Terminal connections may also be made through the dial telephone network. Charges will be based on the number of packets sent, independent of distance.

16c

The FCC said that the entry of "value added" carriers such as PACKET into the communications market would provide new and improved facilities to meet customer data communications requirements. It noted that there remained a variety of issues to be resolved with respect to the terms and conditions of such "value added" proposals, including the use and resale of facilities. The FCC said that it planned to institute a proceeding in the near future to consider these and other "value added" carrier matters.

16d

The Commission also said that it planned to follow a liberal policy for authorizing multi-purpose packet switching networks, pointing out that there was a growing market to be served which existing common carrier service could not satisfy.

16e

All of the PACKET staff would like to take this opportunity to thank all of our friends in the ARPA Network Community. The pioneering efforts of those involved in the ARPANET has made it possible for us to bring these plans for reliable and cost effective computer communications to the commercial marketplace. Our thanks to all those who have so generously supported us.

16f

..... Received from Ralph Alter, 23 November 1973. 16g

(hostname) Standard Host Name Policy Announcement
by Vint G. Cerf

17

Recently there have been many inquiries and exchanges concerning standard host names for the ARPANET, particularly for TELNET and FTP implementation. A recent note from Clements at BBN asking for a standard list of names, and a note from Abhay Bhushan advising the community of the new name, 'MIT-DMS' for MIT-DMCG underlines the revived interest in this subject.

17a

In response to the need for more coordinated planning and standardization, Steve Crocker recently assigned Mike Kudlick (SRI-ARC/NIC) the responsibility of negotiating with all present and new hosts to select a standard host name for each. The intent is to have all protocols implement the standard host names when host names are needed (e.g. TELNET and FTP). Local implementors may want to make up short 'nicknames' as well, and this is not prohibited. The standard list is required and others are permitted.

17b

The target date for preparing the official standard host name list is 31 December 1973. Of course, the list will grow as new hosts are added. Mike Kudlick will arrange negotiations for host names with each host technical liaison. A brief statement of the naming conventions appears below for your information.

17c

To recapitulate the simple rules, host names consist of up to 48 characters drawn from the alphabet (A-Z), the digits (0-9) and the minus sign (-). There is no distinction made between upper and lower case letters. The first character of the name must be a letter and the last character must not be a minus sign, otherwise no restrictions are imposed on the syntax of host names. In order to accommodate multiple networks, we also specify that a complete host name includes a prefix of up to 24 characters, enclosed in parentheses, designating the network in which the host resides. The characters used in the network name are drawn from the same set as for host names, and follow the same syntax rules. No attempt has been made to impose any further structure on these names. As an example of valid names, we have:

17d

(ARPANET)MIT-DMS (CYCLADES)IRIA Erewhon-FAKESITE

17e

fUnNyNaMe-sameas-funnyname (TYMNET)Host-166

17f

(NPLNET)beebleberry-and-associates

17g

The network name prefix need not be supplied for intranetwork usage. The prefix is merely a means of indicating that a foreign host (that is, one not in the network from which access is being made) is being referenced.

17n

Note that no embedded blanks are permitted.

17i

When the first official host name list has been compiled (no later than year's end) it will be published in the ARPANET NEWS. Some thought is also being given to establishing a machine readable copy of this list with corresponding host numbers so that TELNETs and FTPs can update their tables dynamically on a periodic basis. Similarly, it will be possible to interrogate the Resource Notebook online by host name to find out important things such as responsible personnel, how to get accounts, what services are available, etc.

17j

TC:
Speed
reading.